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(54) **SYSTEM AND METHOD FOR PLATE ALIGNMENT**

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E04F 11/18 (2006.01)

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CPC ***E04F 11/1812*** (2013.01); ***E04F 11/1853*** (2013.01); *E04F 2011/1895* (2013.01)

(58) **Field of Classification Search**
CPC E04F 11/1812; E04F 11/1853; E04F 2011/1895; E06B 3/54
See application file for complete search history.

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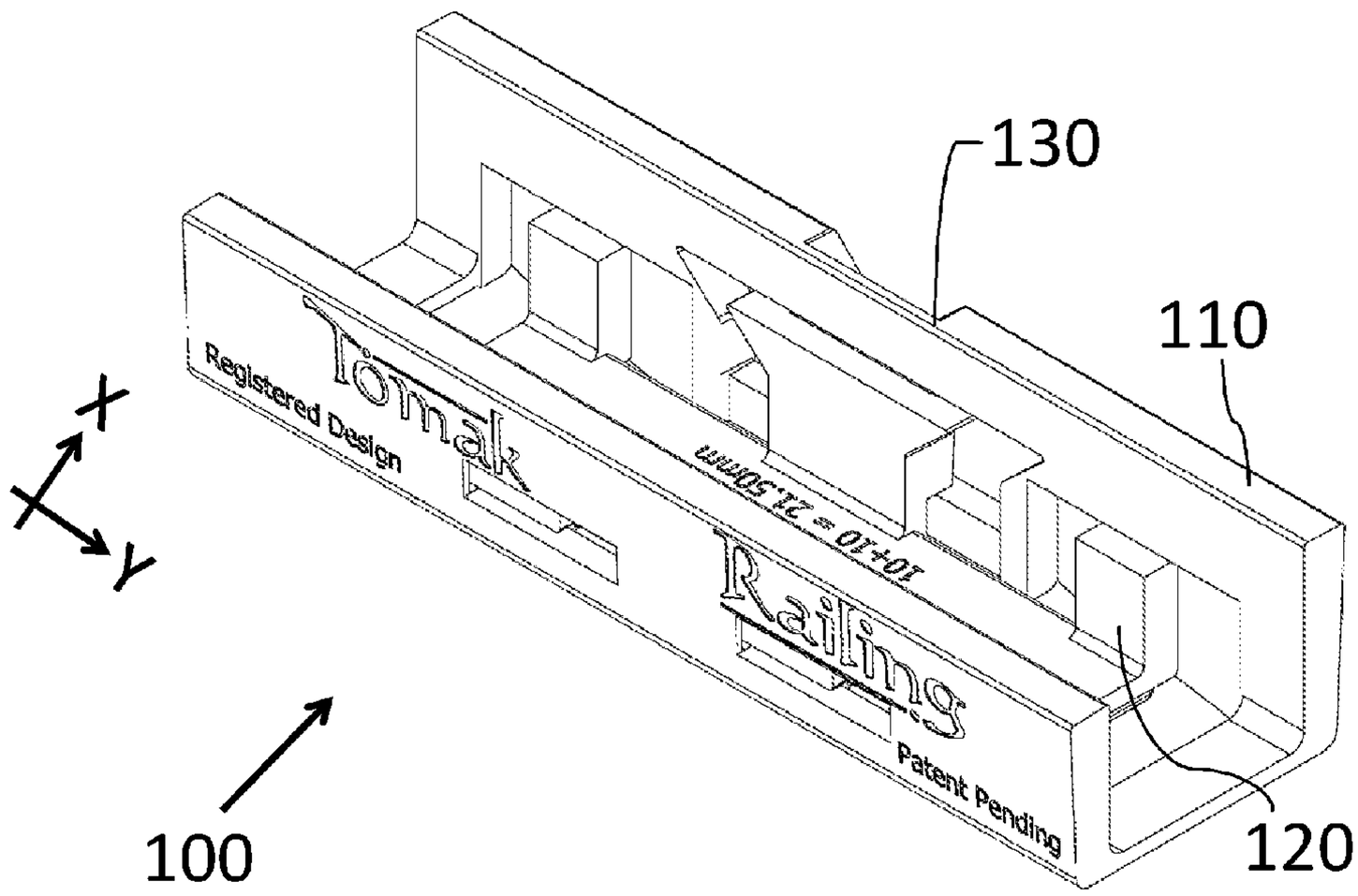
(57) **ABSTRACT**

A plate stabilizing device is configured to couple with an external U-shaped plate profile. The device includes an external segment, corresponding in shape to the external U-shaped plate profile and configured to fit therein. The external segment includes a socket adapted to at least partially accommodate an external alignment tool through a passage serving as a turning point for the external alignment tool, and an internal segment that is configured to accommodate a bottom portion of the plate. The internal segment comprising an alignment tool wedge-like portion capable of accommodating a tip of the alignment tool.

14 Claims, 11 Drawing Sheets



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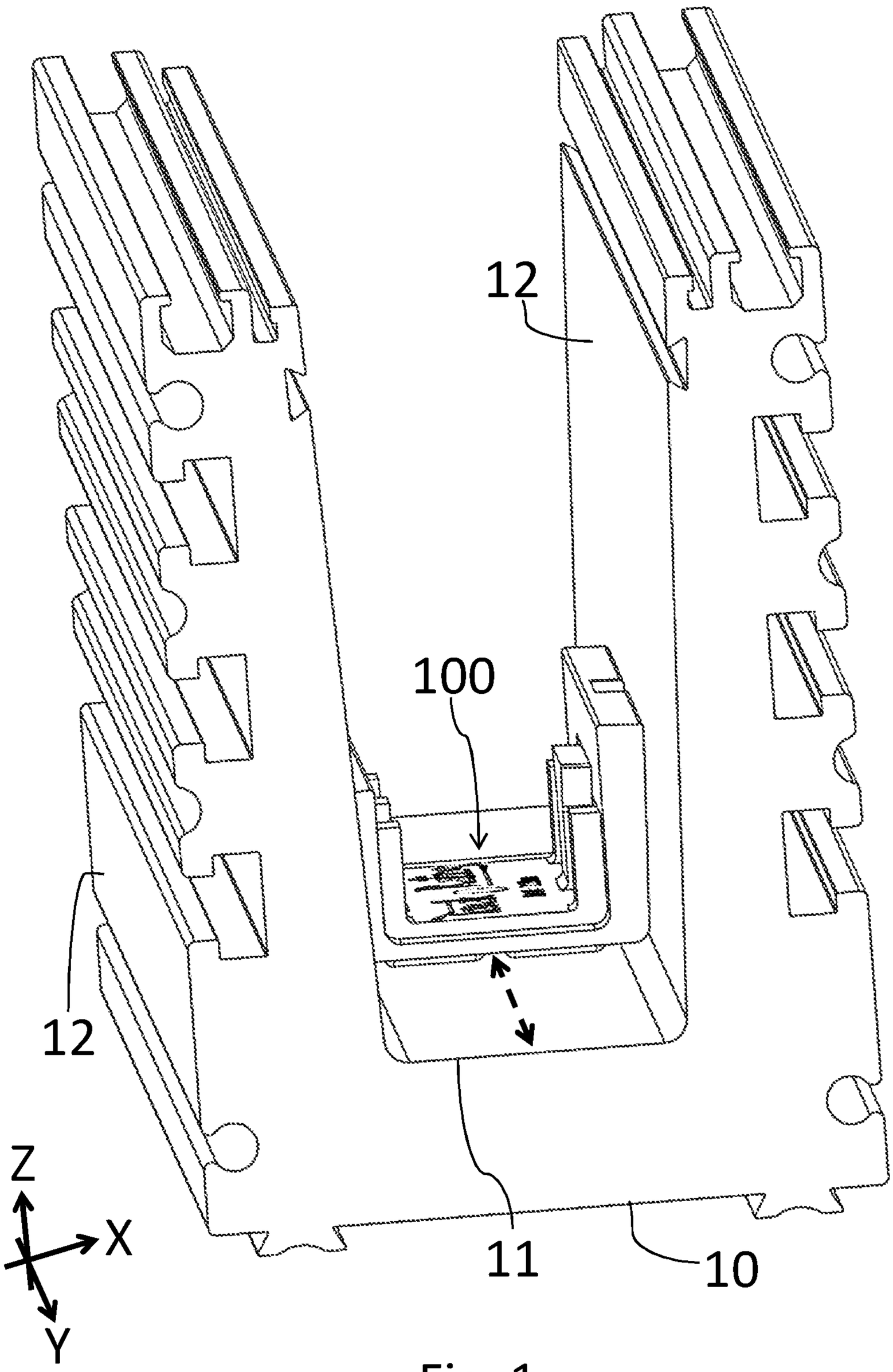


Fig. 1

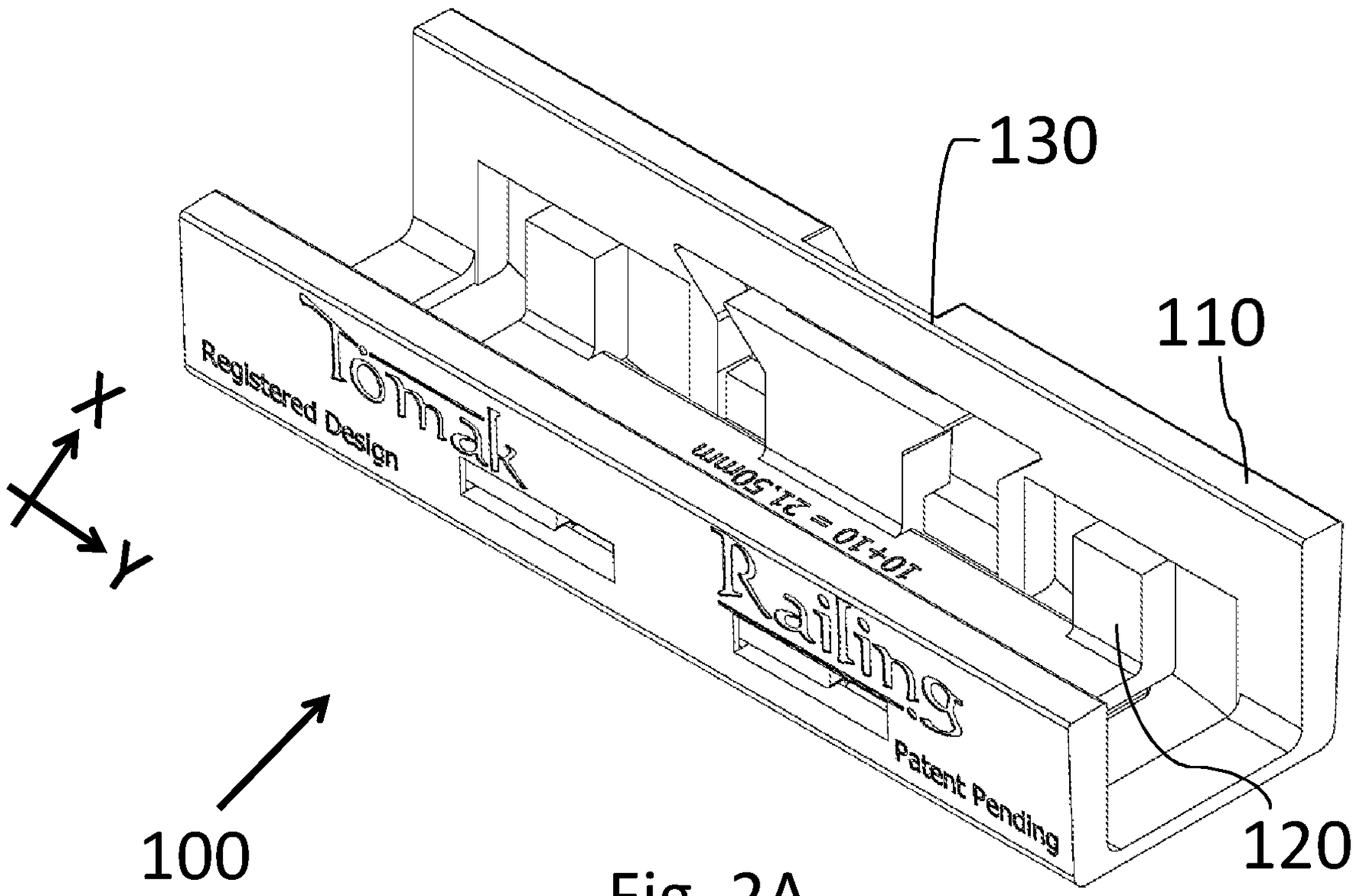

130
110
X
Y
100
120
Tömak
Registered Design
10+10 = 21.50mm
Railing
Patent Pending

Fig. 2A

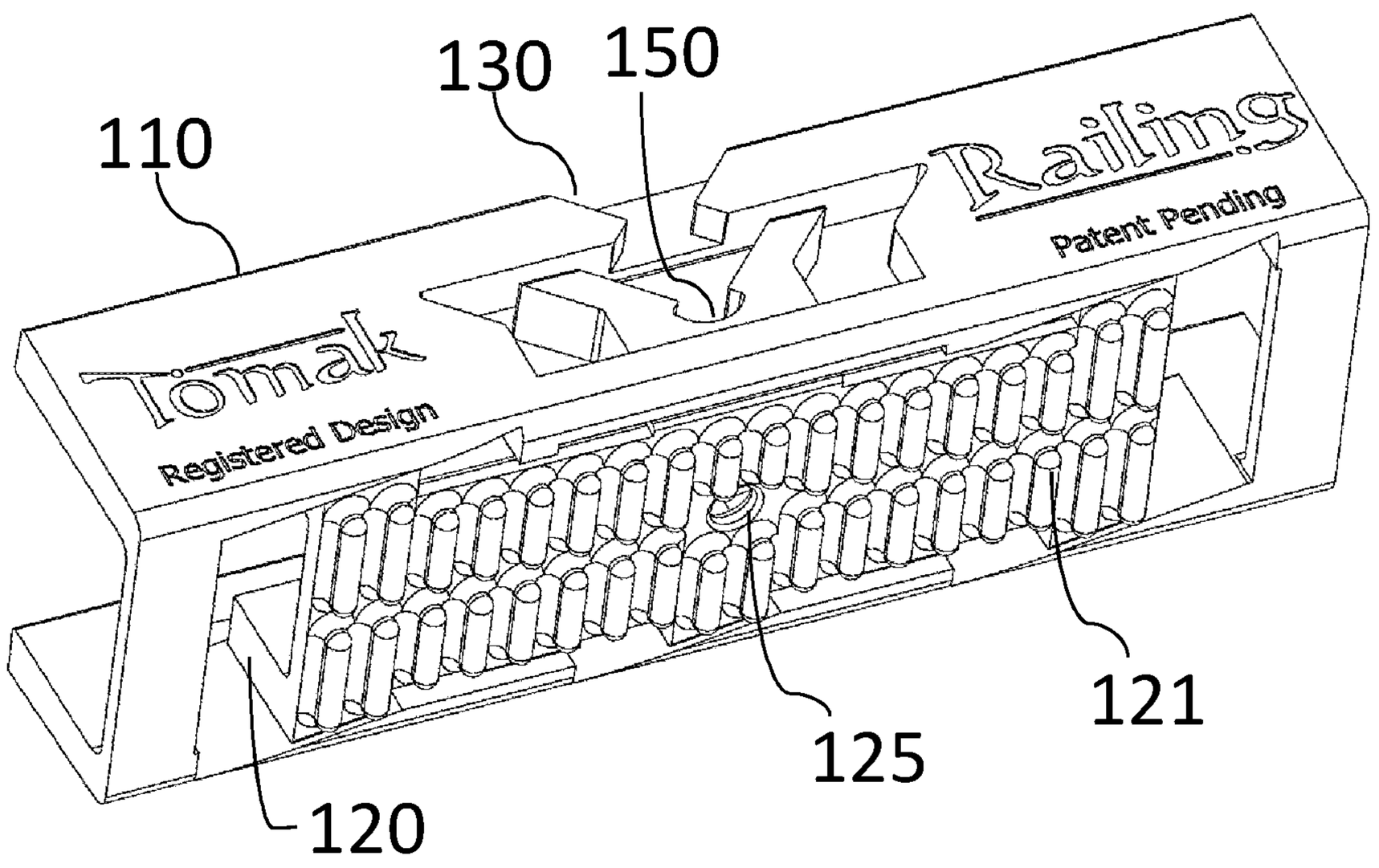

130
150
110
Railing
Patent Pending
Tömak
Registered Design
120
125
121

Fig. 2B

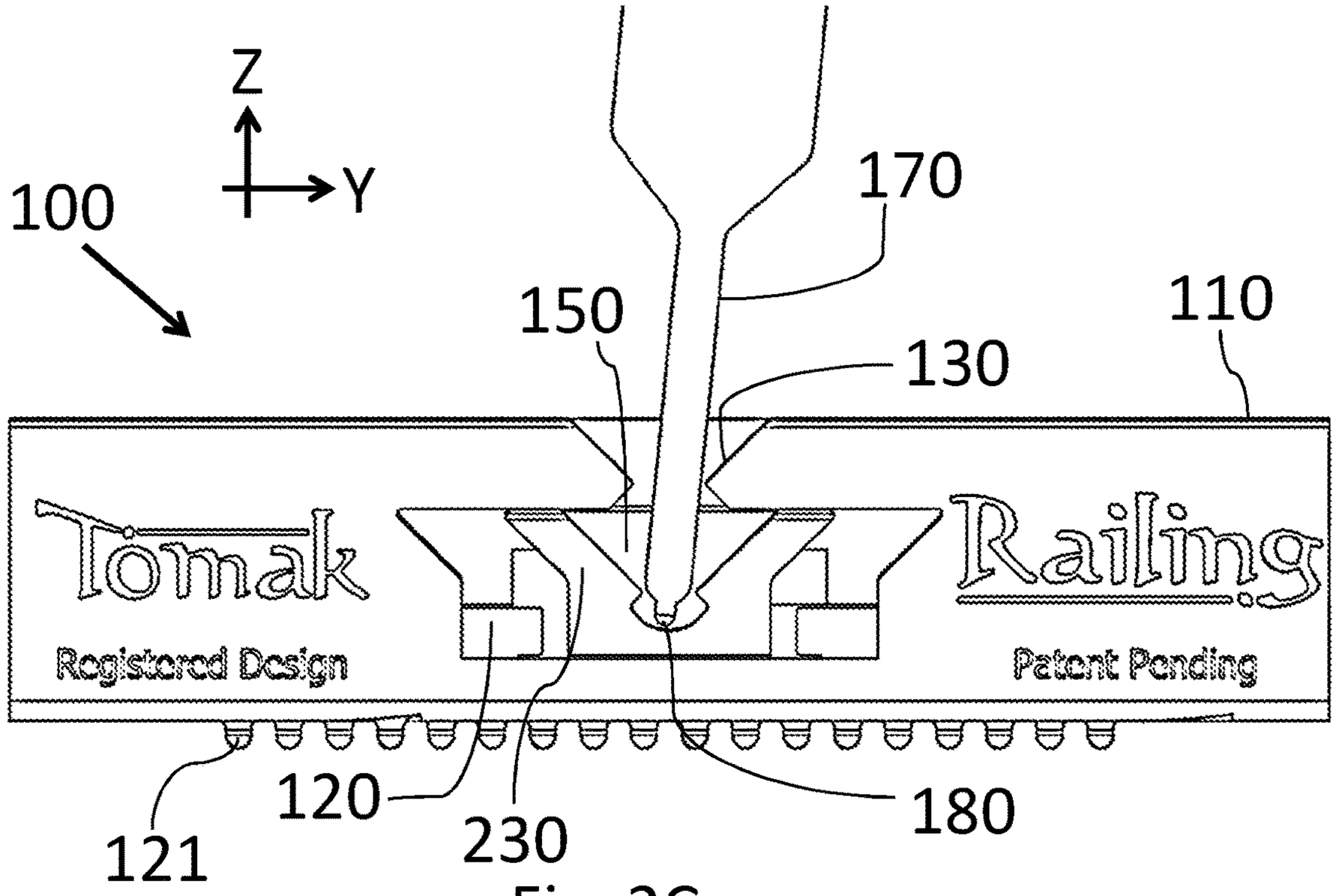

Z
Y
100
170
150
110
130
Tomak
Railing
Registered Design
Patent Pending
120
230
180
121

Fig. 2C

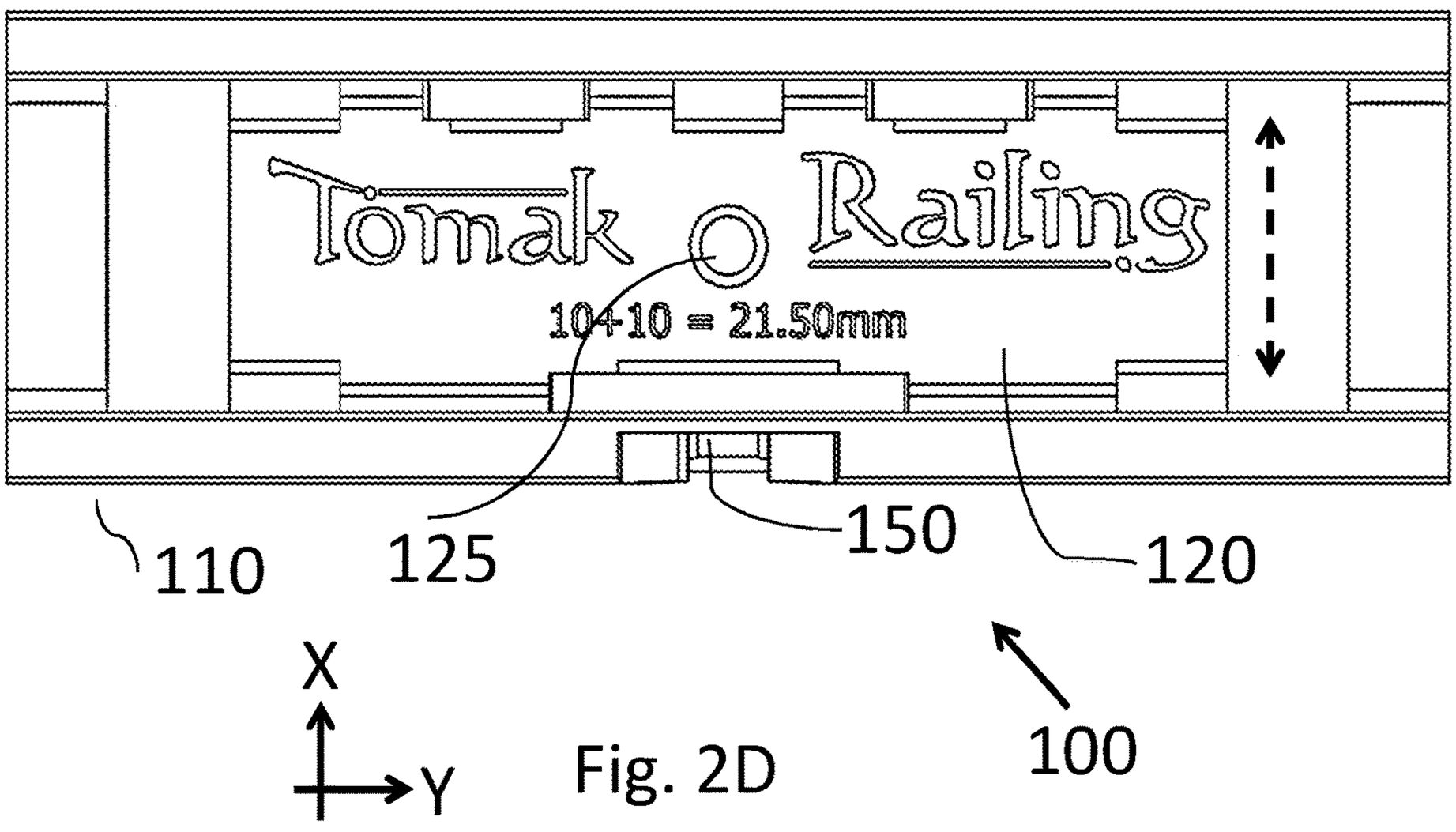

Tomak
Railing
10+10 = 21.50mm
110
125
150
120
X
Y
100

Fig. 2D

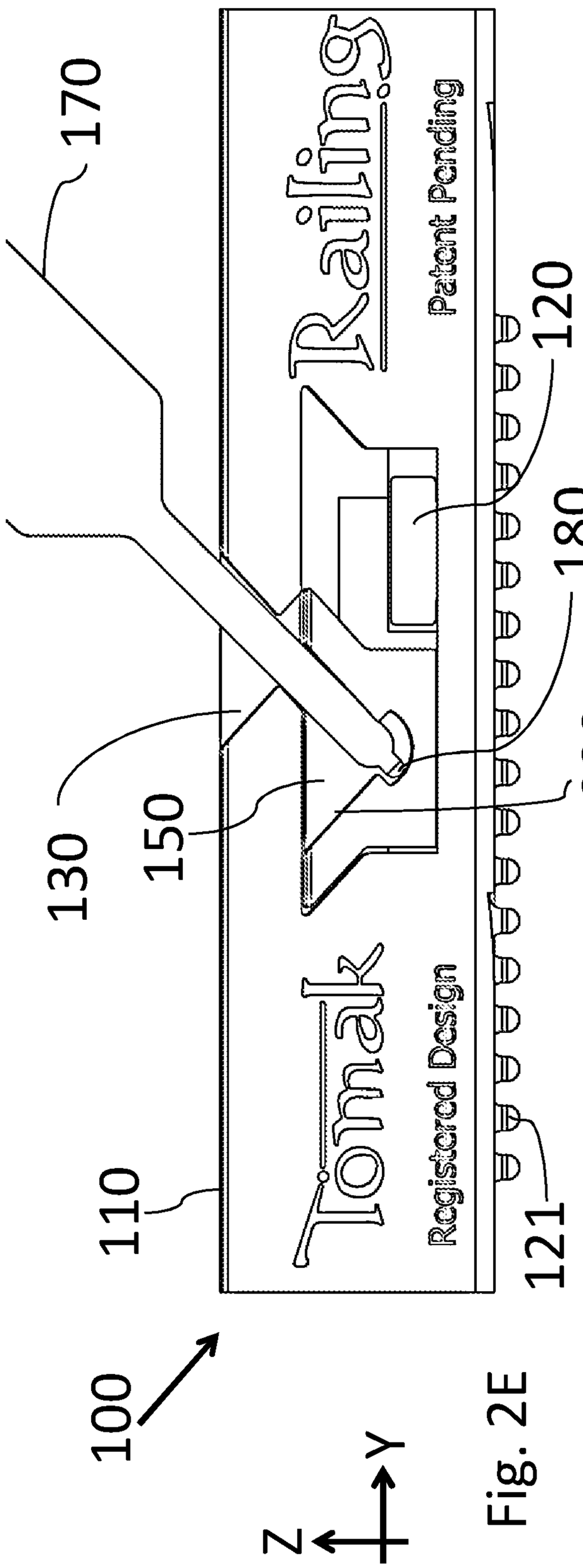
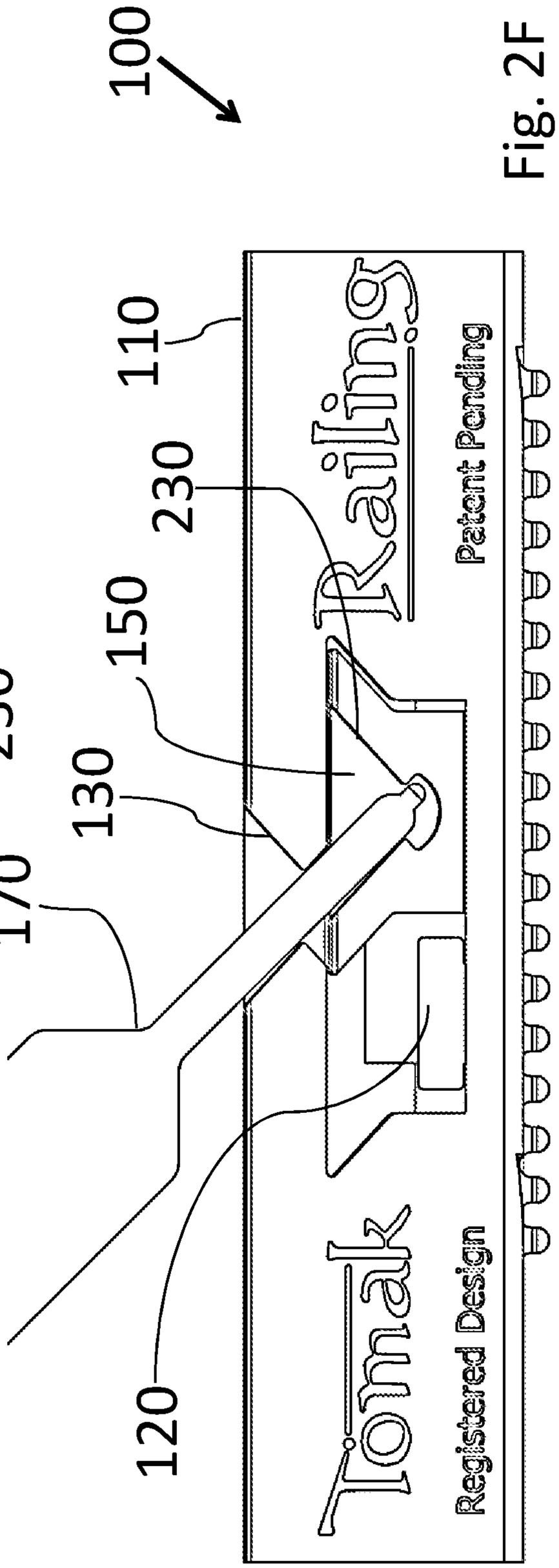

170
Railing
Patent Pending
120
180
230
150
130
Tomak
Registered Design
110
121
100
Z
Y

Fig. 2E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110
Railing
Patent Pending
230
150
130
170
Tomak
Registered Design
120

Fig. 2F

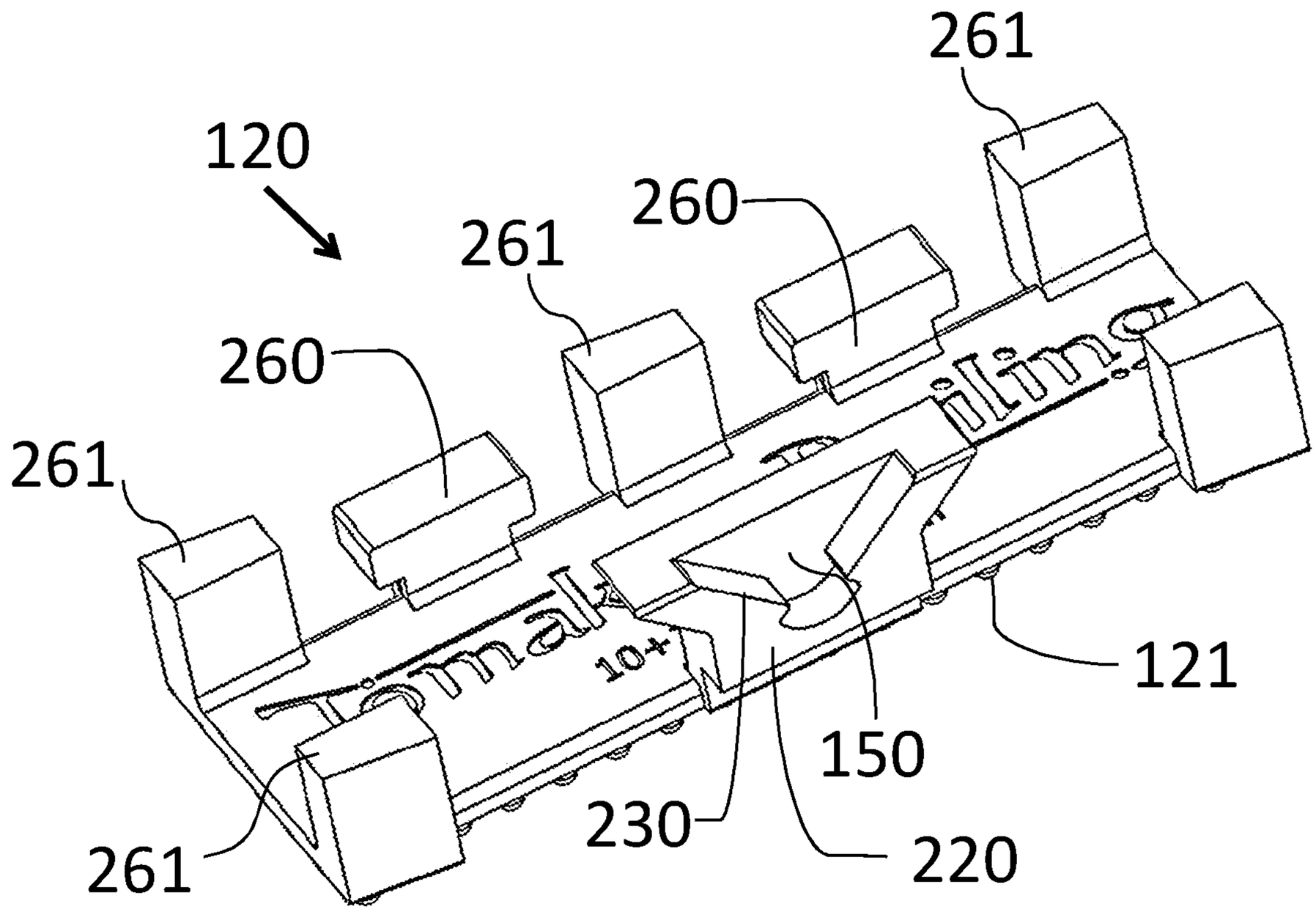
120
261
260
261
260
261
261
Tomalk
10+
121
150
230
220

Fig. 2G

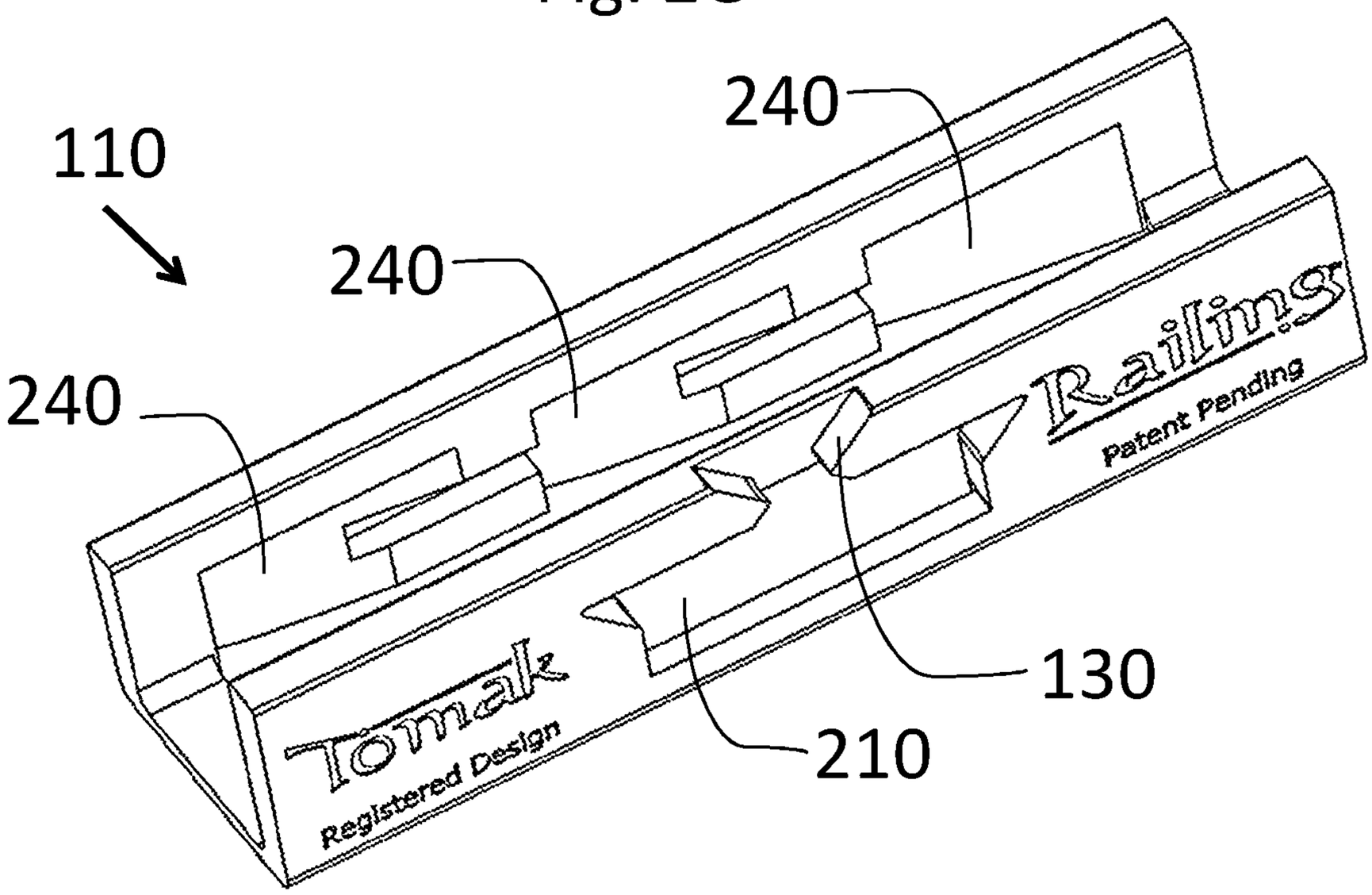
110
240
240
240
Railings
Patent Pending
Tomalk
Registered Design
130
210

Fig. 2H

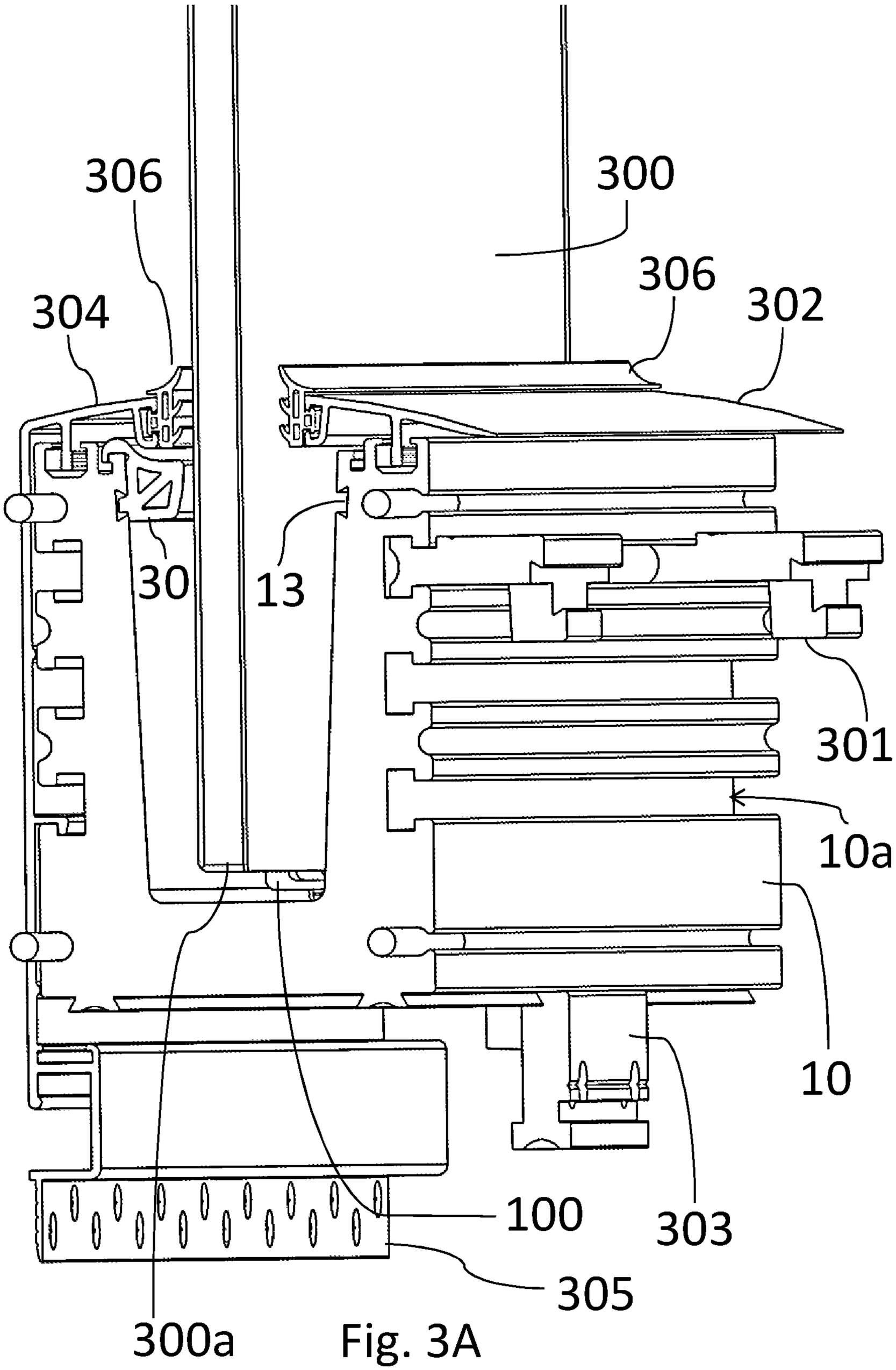

Fig. 3A

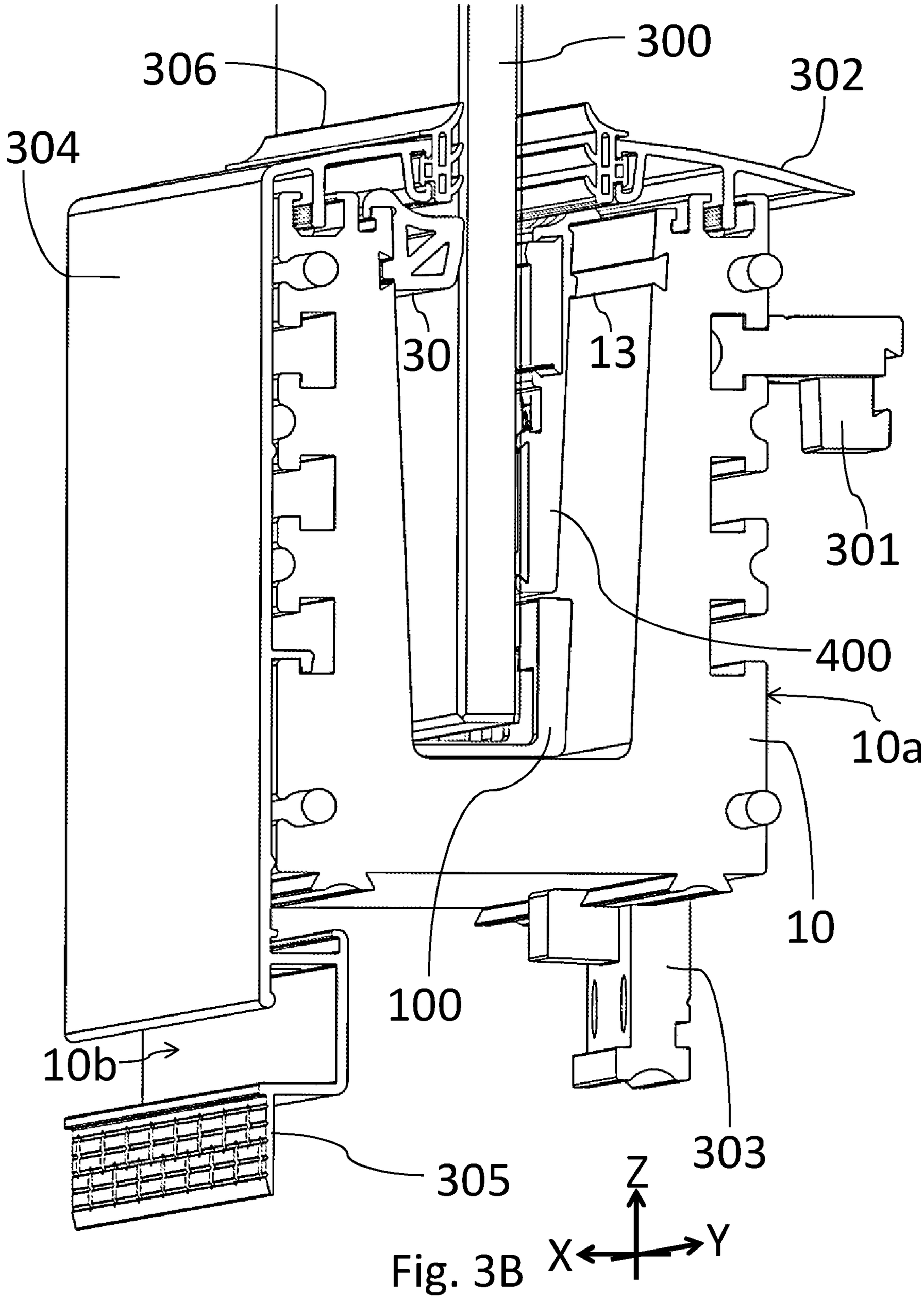

Fig. 3B

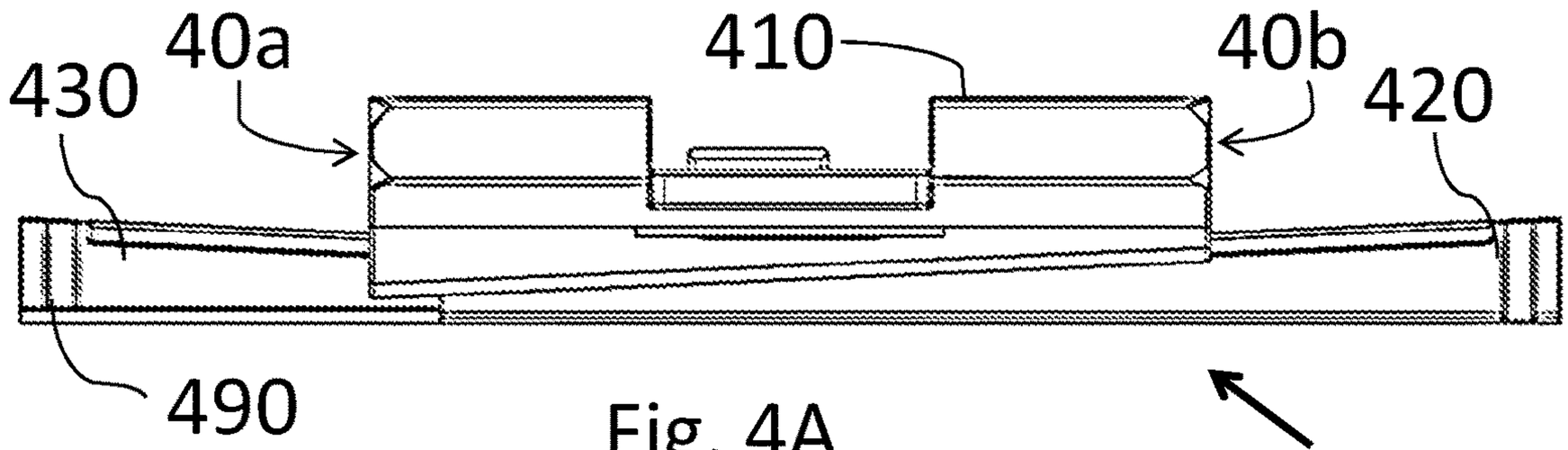

Fig. 4A

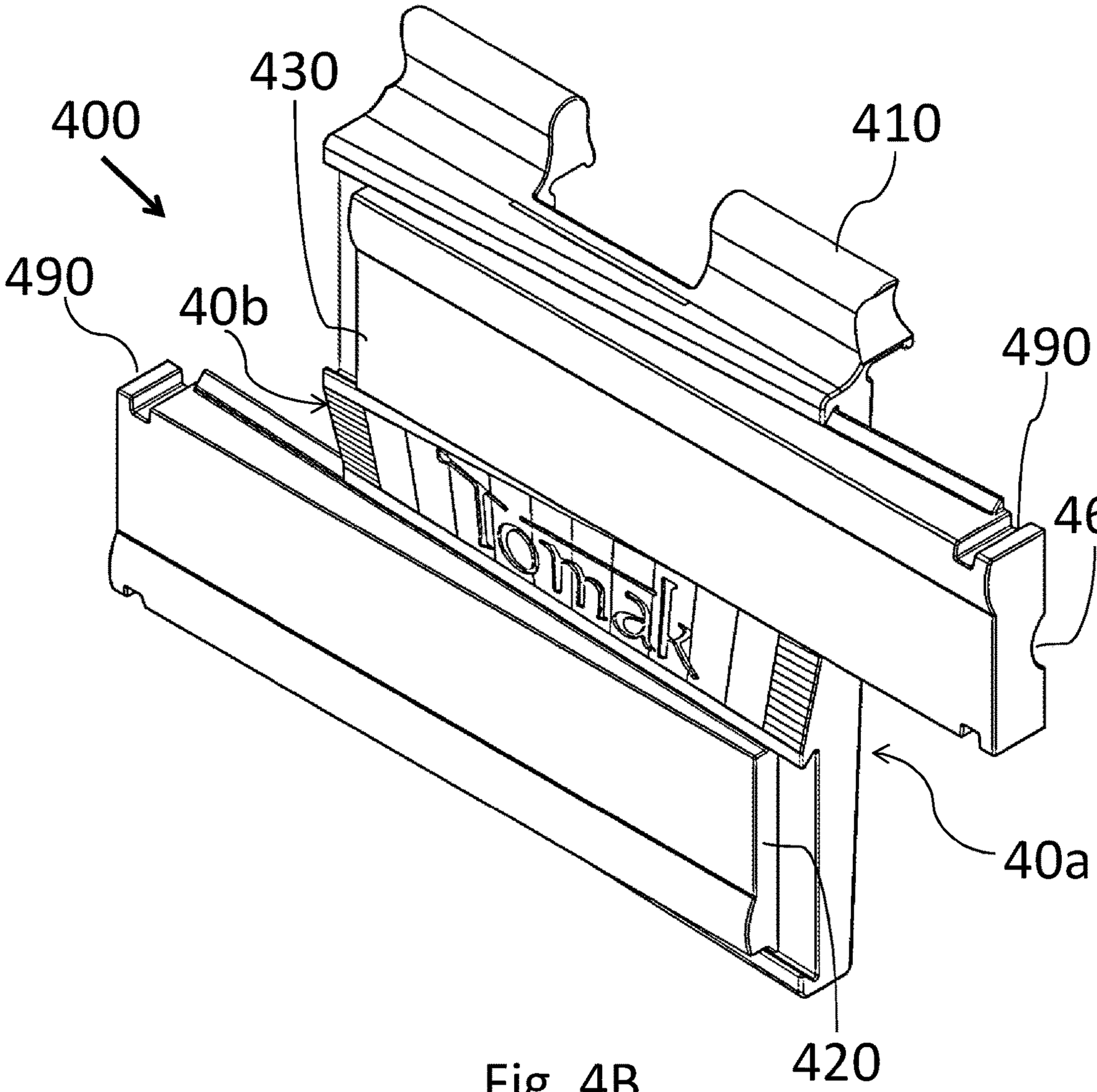

Fig. 4B

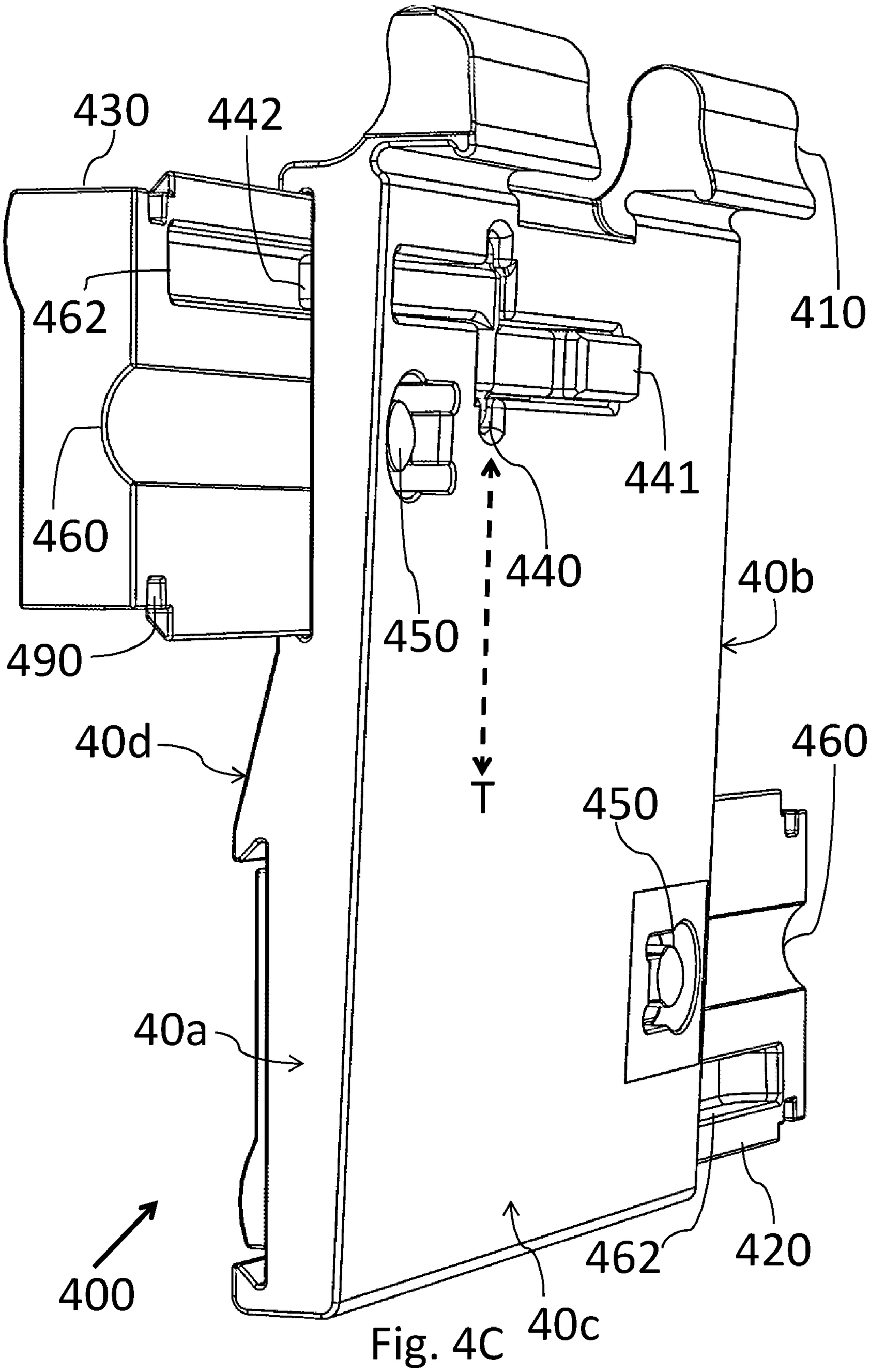
430
442
462
460
490
40d
40a
400
T
441
440
450
40b
410
460
450
462
420
40c

Fig. 4C

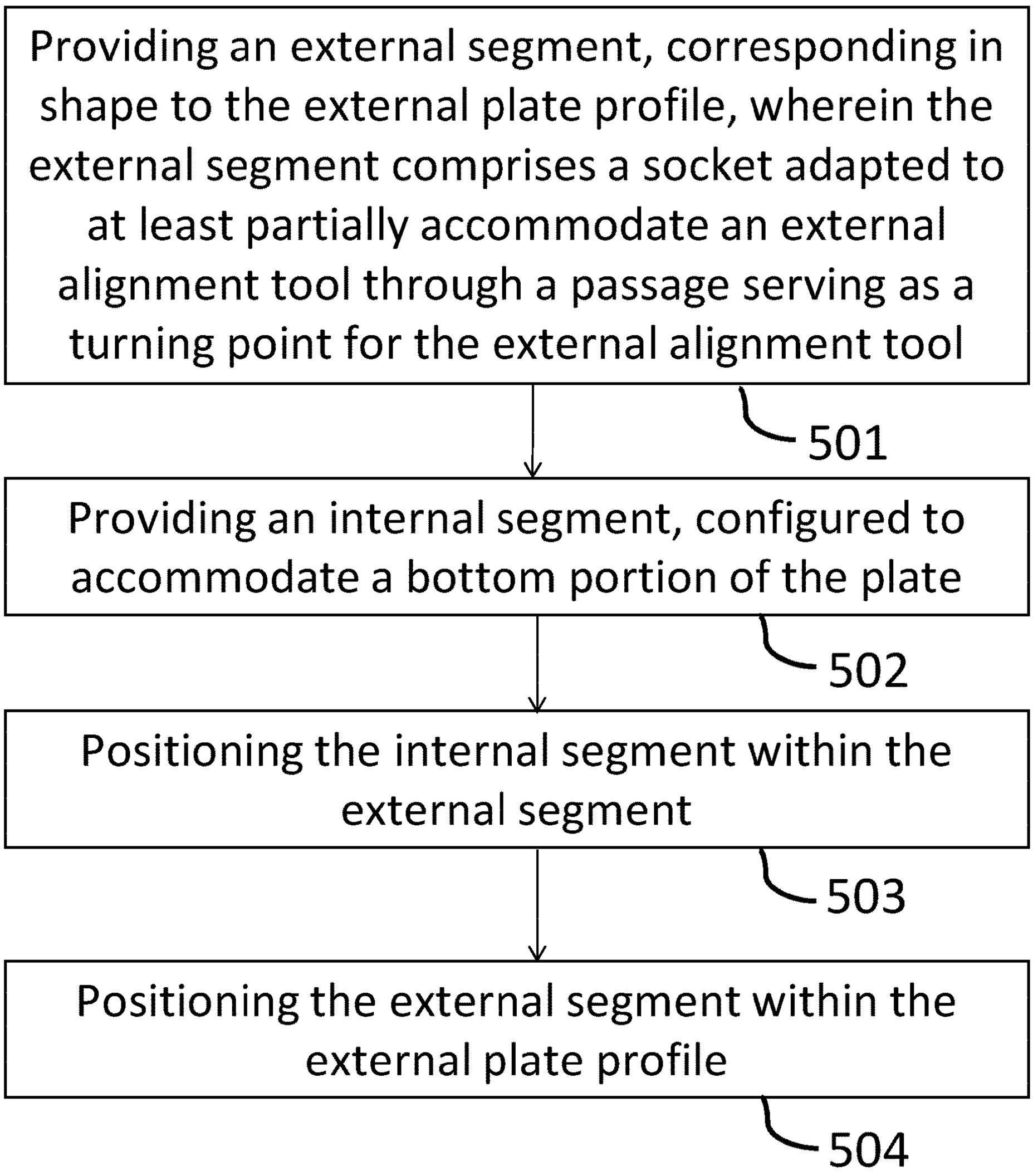
Providing an external segment, corresponding in shape to the external plate profile, wherein the external segment comprises a socket adapted to at least partially accommodate an external alignment tool through a passage serving as a turning point for the external alignment tool
501
Providing an internal segment, configured to accommodate a bottom portion of the plate
502
Positioning the internal segment within the external segment
503
Positioning the external segment within the external plate profile
504

Fig. 5A

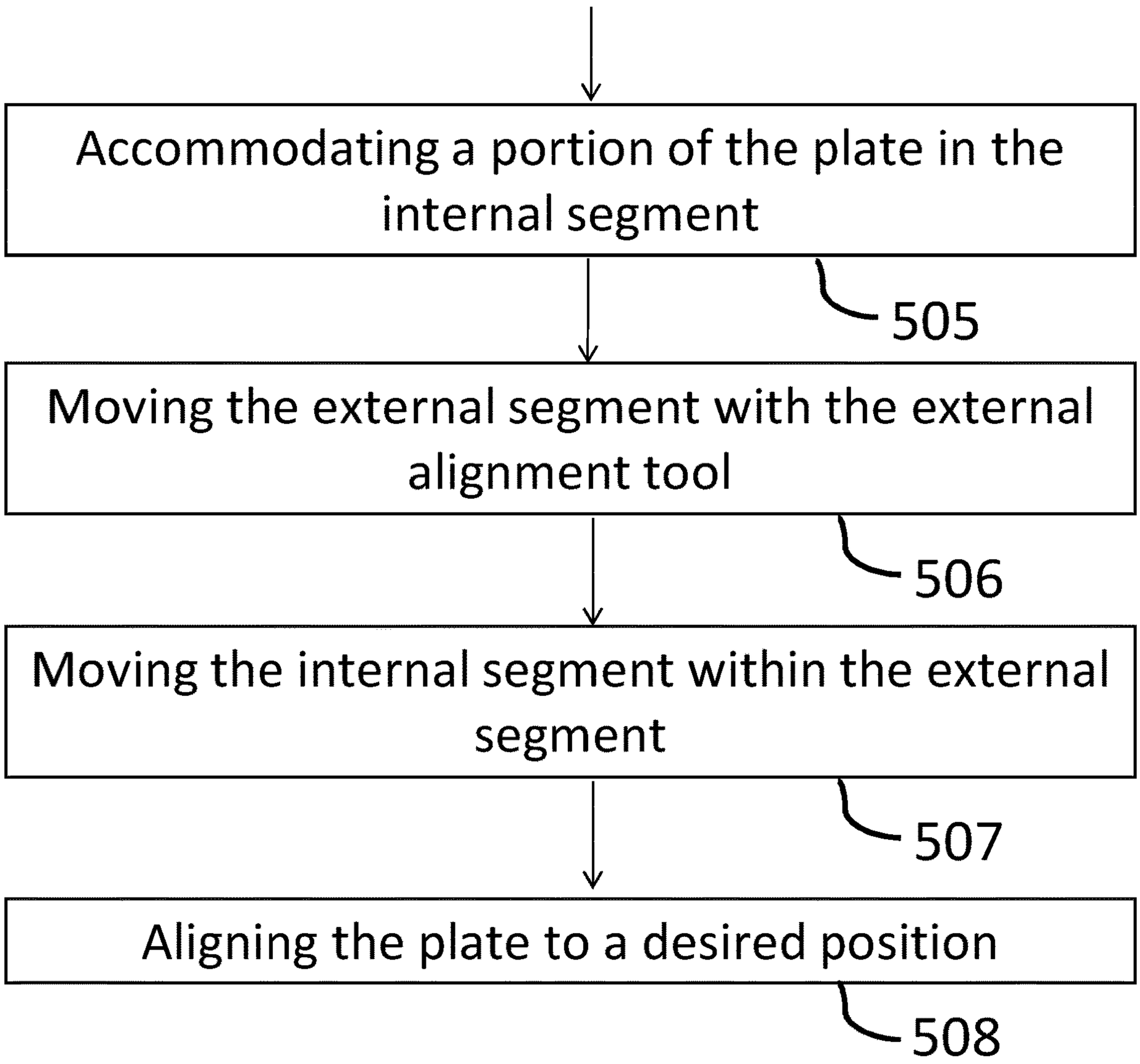
Accommodating a portion of the plate in the internal segment
505
Moving the external segment with the external alignment tool
506
Moving the internal segment within the external segment
507
Aligning the plate to a desired position
508

Fig. 5B

SYSTEM AND METHOD FOR PLATE ALIGNMENT

FIELD OF THE INVENTION

The present invention relates to alignment of plates. More particularly, the present invention relates to devices, systems and methods for plate stabilizing and alignment.

BACKGROUND OF THE INVENTION

Position adjustments for plates of large scale, for instance glass plates in the size of several meters, are usually difficult to perform in order to achieve a desired alignment. This difficulty may occur when alignment is applied at one end of the large plate and where a slight movement or misalignment (e.g., of about 2 millimeters) at the that end, e.g. bottom of the plate, translates into a large movement or misalignment (e.g., of about 20 millimeters) at the top for large scale plates, thereby causing an undesired inclination of the plate.

Plates of large scale having even the slightest inclination may suffer from structural damage with time (e.g., within a year of installation), and in some cases may require replacement of the entire plate. It would therefore be advantageous to provide a solution for easy to perform and accurate alignment of plates.

SUMMARY OF THE INVENTION

There is thus provided, in accordance with some embodiments of the invention, a plate stabilizing device configured to couple with an external U-shaped plate profile, the device including an external segment, corresponding in shape to the external U-shaped plate profile and configured to fit therein, wherein the external segment includes a socket adapted to at least partially accommodate an external alignment tool through a passage serving as a turning point for the external alignment tool, and an internal segment, configured to accommodate a bottom portion of the plate, the internal segment comprising an alignment tool wedge-like portion capable of accommodating a tip of the alignment tool. In some embodiments, the internal segment is configured to move, within the external segment, transversally to the longitudinal axis of the external U-shaped plate profile when the external segment is sliding along the longitudinal axis. In some embodiments, the external segment is configured to be moved by the alignment tool when the alignment tool is inserted through the passage and rests at the wedge-like portion such that the external segment is rotatably turned about the passage thereby sliding the external segment along the longitudinal axis.

In some embodiments, at least one of the external segment and the internal segment include an elastic material. In some embodiments, the device is configured to allow movement within the external U-shaped plate profile. In some embodiments, engagement of the external segment with the external alignment tool is configured to indicate an angle of inclination of the plate.

There is thus provided, in accordance with some embodiments of the invention, a plate stabilizing system configured to couple with an external U-shaped plate profile, the system including an external segment, corresponding in shape to the external U-shaped plate profile and configured to fit therein, wherein the external segment includes a socket adapted to at least partially accommodate an external alignment tool through a passage serving as a turning point for the external alignment tool, an internal segment, configured to accommodate a bottom portion of the plate, the internal segment comprising an alignment tool wedge-like portion capable of accommodating a tip of the alignment tool, and a resilient barrier, configured to allow an inclination fixed point for the plate. In some embodiments, the internal segment is configured to move, within the external segment, transversally to the longitudinal axis of the external U-shaped plate profile when the external segment is sliding along the longitudinal axis. In some embodiments, the external segment is configured to be moved by the alignment tool when the alignment tool is inserted through the passage and rests at the wedge-like portion such that the external segment is rotatably turned about the passage thereby sliding the external segment along the longitudinal axis.

In some embodiments, engagement of the external segment with the external alignment tool is configured to indicate an angle of inclination of the plate.

There is thus provided, in accordance with some embodiments of the invention, a method of aligning a plate within an external plate profile, the method including providing an external segment, corresponding in shape to the external plate profile, wherein the external segment includes a socket adapted to at least partially accommodate an external alignment tool through a passage serving as a turning point for the external alignment tool, providing an internal segment, configured to accommodate a bottom portion of the plate, positioning the internal segment within the external segment, positioning the external segment within the external plate profile, accommodating a portion of the plate in the internal segment, moving the external segment with the external alignment tool, moving the internal segment within the external segment, and aligning the plate to a desired position.

In some embodiments, the method further includes engaging the external alignment tool with the socket, wherein engagement of the external segment with the external alignment tool is configured to indicate an angle of inclination of the plate. In some embodiments, the method further includes providing at least one additional external segment. In some embodiments, the method further includes providing at least one additional internal segment.

In some embodiments, the internal segment includes an alignment tool wedge-like portion capable of accommodating a tip of the alignment tool, and wherein the method further includes engaging the tip of the external alignment tool with the wedge-like portion.

In some embodiments, the method further includes moving the internal segment transversally to the longitudinal axis when sliding along the longitudinal axis of the external segment. In some embodiments, the method further includes rotatably turning the internal segment about the passage, thereby sliding the internal segment along the longitudinal axis. In some embodiments, the method further includes providing a resilient barrier, configured to allow an inclination fixed point for the plate.

BRIEF DESCRIPTION OF THE DRAWINGS

The subject matter regarded as the invention is particularly pointed out and distinctly claimed in the concluding portion of the specification. The invention, however, both as to organization and method of operation, together with objects, features, and advantages thereof, may best be understood by reference to the following detailed description when read with the accompanying drawings in which:

FIG. **1** illustrates a perspective view of a plate stabilizing device positioned within a portion of an external plate profile, according to some embodiments of the invention;

FIG. **2**A illustrates a perspective view of plate stabilizing device, according to some embodiments of the invention;

FIG. **2**B illustrates a bottom perspective view of plate stabilizing device, according to some embodiments of the invention;

FIG. **2**C illustrates a frontal view of the alignment tool engaged with a wedge-like portion of an internal segment of the plate stabilizing device, according to some embodiments of the invention;

FIG. **2**D illustrates a top view of the plate stabilizing device, according to some embodiments of the invention;

FIG. **2**E illustrates a frontal partial view of internal segment moved to a first end by alignment tool, according to some embodiments of the invention;

FIG. **2**F illustrates a frontal partial view of internal segment moved to a second end by alignment tool, according to some embodiments of the invention

FIG. **2**G illustrates a perspective view of the internal segment of the plate stabilizing device, according to some embodiments of the invention;

FIG. **2**H illustrates a perspective view of the external segment of the plate stabilizing device, according to some embodiments of the invention;

FIG. **3**A illustrates a perspective view of a plate coupled to the plate stabilizing device within the external plate profile, according to some embodiments of the invention;

FIG. **3**B illustrates a back perspective view of a plate coupled to the plate stabilizing device within the external plate profile, according to some embodiments of the invention;

FIG. **4**A illustrate a top view of a plate locking wedge, according to some embodiments of the invention;

FIG. **4**B illustrate a perspective view of the plate locking wedge, according to some embodiments of the invention;

FIG. **4**C illustrates a back perspective view of the plate locking wedge, according to some embodiments of the invention;

FIG. **5**A shows a flow chart for a method of aligning a plate within an external plate profile, according to some embodiments of the invention; and

FIG. **5**B shows a continuation of the flow chart for a method of aligning a plate within an external plate profile from FIG. **5**A, according to some embodiments of the invention.

It will be appreciated that for simplicity and clarity of illustration, elements shown in the figures have not necessarily been drawn to scale. For example, the dimensions of some of the elements may be exaggerated relative to other elements for clarity. Further, where considered appropriate, reference numerals may be repeated among the figures to indicate corresponding or analogous elements.

DETAILED DESCRIPTION OF THE INVENTION

In the following detailed description, numerous specific details are set forth in order to provide a thorough understanding of the invention. However, it will be understood by those skilled in the art that the present invention may be practiced without these specific details. In other instances, well-known methods, procedures, and components have not been described in detail so as not to obscure the present invention.

Reference is now made to FIG. **1**, which illustrates a perspective view of a plate stabilizing device **100** positioned within a portion of an external plate profile **10**, according to some embodiments of the invention. External U-shaped plate profile **10** includes two walls **12** such that plate stabilizing device **100** may be positioned and/or coupled therebetween, for example engaging base **11** of external plate profile **10**. It may be appreciated that only a portion of external U-shaped plate profile **10** is illustrated in FIG. **1**.

In some embodiments, plate stabilizing device **100** may be moved along a longitudinal axis 'Y' of external U-shaped plate profile **10**, as indicated with a double headed dashed arrow in FIG. **1**, for example for positioning plate stabilizing device **100** in a desired position.

Reference is now made to FIGS. **2**A-**2**B, which show the plate stabilizing device **100**. FIG. **2**A illustrates a perspective view of plate stabilizing device **100** and FIG. **2**B illustrates a bottom perspective view of the same, according to some embodiments of the invention.

Plate stabilizing device **100** may include an external segment **110**, corresponding in its outer shape to the external U-shaped plate profile **10** and configured to fit therein (e.g., as shown in FIG. **1**). In some embodiments, external segment **110** may include a socket **130** adapted to at least partially accommodate an external alignment tool **170** (e.g., as shown in FIG. **2**C) through a passage serving as a turning point for the external alignment tool **170**, as further described hereinafter.

Plate stabilizing device **100** may further include an internal segment **120**, configured to accommodate an end side, such as bottom portion, of the plate and adapted to slide within external segment **110** along a transversal axis 'X' perpendicular to the longitudinal axis of external segment **110**, which coincides with the longitudinal axis 'Y' of the external U-shaped plate profile **10** when installed in it. In some embodiments, engagement of alignment tool **170** with external segment **110** may be configured to indicate an angle of inclination of the plate. In some embodiments, internal segment **120** may include an alignment tool wedge-like portion **150** capable of accommodating a tip **180** of the alignment tool **170** (e.g., as shown in FIG. **2**C). According to some embodiments, at least one of external segment **110** and internal segment **120** may include an elastic and/or resilient material.

In some embodiments, internal segment **120** may be configured to move transversally to the longitudinal axis 'Y' when external segment **110** slides along the longitudinal axis 'Y', as further described hereinafter. In some embodiments, internal segment **120** may include an elastic bottom portion **121** configured to prevent or resist to movement of internal segment along the longitudinal axis of base **11** and concurrently allow movement of internal segment **120** transversal to the longitudinal axis of base **11** of the external U-shaped plate profile **10** (e.g., as shown in FIG. **1**). Accordingly, when external segment **110** is forced by alignment tool **170** to move along the longitudinal axis, as described below, internal segment **120** will resist to move with external segment **110** in that direction, but will be forced to move transversally to that direction. Since the resistance of internal segment **120** to move longitudinally is due to friction produced by elongated protrusions formed on the bottom face of bottom portion **121**, when plate stabilizing device **100** carries the weight of a plate, such as plate **300** (FIG. **3**A), the resistance force grows bigger, thereby ensuring longitudinal stability of plate **300** with respect to external U-shaped plate profile **10**. In some embodiments, bottom portion **121** may include an aperture **125**

According to some embodiments, external segment **110** may be moved by alignment tool **170** when the alignment tool is inserted through the passage and rests at wedge-like portion **150** such that alignment tool **170** may be rotatably turned about the passage thereby sliding external segment **110** along the longitudinal axis 'Y'.

Reference is now made to FIG. **2**C, which illustrates a frontal view of alignment tool **170** engaged with wedge-like portion **150** of internal segment **120**, according to some embodiments of the invention. In some embodiments, alignment tool **170** may be inserted, for instance by a user, into wedge-like portion **150** while internal segment **120** accommodates a bottom portion of the plate, as further describe hereinafter. It may be appreciated that moderate movements by alignment tool **170** may cause external segment **110** to move relatively to internal segment **120** along the longitudinal axis 'Y', and thereby move internal segment **120** along the transversal axis 'X' so as to align the plate accommodated by internal segment **120**. In some embodiments, movement of external segment **110** may allow fine-tuning, for instance with long movement of the user causing small movement of the plate stabilizing device.

Reference is now made to FIG. **2**E-**2**F, which illustrates a frontal partial view of external segment **110** moved to a first end and second end relative to internal segment **120** by alignment tool **170**, according to some embodiments of the invention. It may be appreciated that the user moving alignment tool **170**, for instance engaged with wedge-like portion **150** of internal segment **120**, may move external segment **120** between a first end (as shown in FIG. **2**E) and a second end (as shown in FIG. **2**F).

In some embodiments, alignment tool **170** may be reusable and after aligning a first plate, a second plate may be aligned in a similar fashion with the same alignment tool **170**. In some embodiments, it may be possible to know where, inside the range of tuning, i.e. the range of transversal movement of internal segment **120** with respect to external segment **110** as a result of angular inclination of alignment tool **170** about the tips of socket **130**, plate stabilizing device **100** resides just by insertion of alignment tool **170** and realizing its angle of inclination with respect to a predetermined reference angle.

Reference is now made to FIG. **2**D, which illustrates a top view of plate stabilizing device **100**, according to some embodiments of the invention. It may be appreciated that external segment **110** may be moved, for instance by alignment tool **170**, along the longitudinal axis 'Y' of plate stabilizing device **100**, thereby moving internal segment **120** along the transverse axis 'X' indicated with a double headed dashed arrow in FIG. **2**D.

Reference is now made to FIGS. **2**G-**2**H, which illustrates a perspective view of the internal segment **120** and external segment **110** respectively, according to some embodiments of the invention. In some embodiments, external segment **110** may include a first window **210** configured to accommodate a corresponding first projection **220** of internal segment **120**, where first projection **220** may include wedge-like portion **150**. It may be appreciated that movement of internal segment **120** within external segment **110**, for instance external segment **110** moved by alignment tool **170**, may cause first projection **220** to move inside first window **210**. It should be appreciated that according to some embodiments the range of movement of projection **220** inside window **210** defines the range of tuning.

In some embodiments, external segment **110** may further include at least one second window **240** configured to accommodate at least one corresponding second projection **260** of internal segment **120**. In some embodiments, internal segment **120** may further include at least one third projection **261**, for example shaped as vertical trapezoid. It may be appreciated that second projections **260** may be configured to cause the transversal movement when sliding abut inclined surfaces of corresponding second window **240**. Similarly to movement within first window **210**, movement of internal segment **120** within external segment **110**, for instance when external segment **110** moved by alignment tool **170**, may cause at least one second projection **260** to move inside at least one second window **240**.

According to some embodiments, internal segment **120** may include a tilted surface **230** (e.g., tilted in respect to bottom portion **121**) corresponding in shape to socket **130** of external segment **110**. For example, alignment tool **170** moving external segment **110** along the longitudinal axis to a first end, may contact socket **130** and tilted surface **230**.

Reference is now made to FIGS. **3**A-**3**B, which illustrate a perspective view and a back perspective view of a plate **300** coupled to plate stabilizing device **100** within external plate profile **10** respectively, according to some embodiments of the invention. In some embodiments, additional utility elements may be coupled and/or attached to external plate profile **10** in order to further stabilize and/or align and/or provide sealing and/or cladding to plate **300**. Plate **300** may be, for instance, a glass plate of twenty millimeter thickness.

In some embodiments, at least one first hanging profile **301** and/or at least one second hanging profile **303** may be attached to a first side **10***a* of external plate profile **10** in order to attach external plate profile **10** to an existing structure (e.g. attach to a wall). In some embodiments, at least one first cladding attachment **302** may be attached to first side **10***a* in order to at least partially cover external plate profile **10**. In some embodiments, an elastic barrier **306** may be attached to first cladding attachment **302** in order to prevent contact with plate **300**. According to some embodiments, a user may use alignment tool **170** (e.g., moving tool **170** along the plane 'YZ') to move external segment **110** located inside plate stabilizing device **100** along the longitudinal axis 'Y', whereby internal segment **120** may not move along the longitudinal axis 'Y' due to coupling with plate **300**. Thus, moving internal segment **120** along the transverse axis 'X', so as to move the bottom end **300***a* of plate **300** transversally, thereby inclining plate **300** along the plane 'XZ' to a desired inclination angle about inclination fixed point provided by a resilient barrier **30** (e.g. made of glass) thereby enabling alignment of plate **300**, prior to attachment of first cladding attachment **302**. In some embodiments, the resilient barrier **30** may be attached to external plate profile **10**, for instance attached to a top groove **13** in external plate profile **10**, in order to provide a longitudinal pivot element and thereby further stabilize plate **300**.

In some embodiments, at least one second cladding attachment **304** may be attached to a second side **10***b* (opposite to first side **10***a*) of external plate profile **10** in order to at least partially cover external plate profile **10** from the external side. In some embodiments, an elastic barrier **306** may be attached to second cladding attachment **304** in order to prevent contact with plate **300**. In some embodiments, second cladding attachment **304** may have a shape and/or size configured to be compatible with an exterior of a wall, for example compatible with a drywall. In some embodiments, second cladding attachment **304** may include a bottom groove **305** configured to allow engagement with additional external elements.

Reference is now made to FIGS. **4**A-**4**B, which illustrate a top view and a perspective view of a plate locking wedge **400** respectively, according to some embodiments of the invention. According to some embodiments, at least one wedge **400** may be attached to external plate profile **10** in order to further align plate **300**, as further described hereinafter.

Wedge **400** may include a body **410** configured to attach and/or couple with external plate profile **10**. Body **410** may include at least one recess configured to allow accommodation of at least one of first slab **420** and second slab **430**, wherein the surface of at least one of first slab **420** and second slab **430** may be configured to engage plate **300**. According to some embodiments body **410** may be attached to plate **300** while at least one of first slab **420** and second slab **430** may be configured to engage with external plate profile **10**.

According to some embodiments, at least one of first slab **420** and second slab **430** may be narrower at one end, so as to allow wedge operation including partial movement of the slab along movement line parallel to the longitudinal axis and thereby at least partially engage the plate. In some embodiments, first slab **420** may be narrower at a first end **40***a*, and second slab **430** may be narrower at a second opposite end **430**.

In some embodiments, first slab **420** may be configured to move within the recess in an opposite direction to the movement of second slab **430**. In some embodiments, movement of at least one of first slab **420** and second slab **430** towards the center of wedge **400** may move adjacent plate **300** away from wedge **400**. In some embodiments, at least one of first slab **420** and second slab **430** may be moved by an external tool, for instance operated by the user.

Reference is now made to FIG. **4**C, which illustrates a back perspective view of the plate locking wedge **400**, according to some embodiments of the invention. Plate locking wedge **400** may further include a tilting lock **440**, configured to secure plate locking wedge **400** into it's position within external plate profile **10**. It should be appreciated that such securing of the position may allow plate locking wedge **400** to be resilient to force applied by plate **300** upon engagement with plate locking wedge **400**, thus maintaining position of plate locking wedge **400**.

In some embodiments, securing of the position of plate locking wedge **400** may be achieved with tilting lock **440** that may swivel about a tilting axis indicated with a dashed arrow marked 'T'. Tilting lock **440** may include a first retractable protrusion **441**, configured to protrude from back side **40***c* of wedge **400**, and a second retractable protrusion **442**, configured to protrude from frontal side **40***d* of wedge **400**, that tilt together with first retractable protrusion **441** about the tilting axis. When first retractable protrusion **441** protrudes from back side **40***c* then second retractable protrusion **442** retracts from frontal side **40***d*, and vice versa when second retractable protrusion **442** protrudes from frontal side **40***d* then first retractable protrusion **441** retracts from back side **40***c* and inwards to plate locking wedge **400**.

In some embodiments, first retractable protrusion **441** may be configured to engage top groove **13** of external plate profile **10** (for instance as shown in FIGS. **3**A-**3**B) in order to abut top groove **13** and thereby secure the position of wedge **400** until first retractable protrusion **441** is retracted and stop abutting top groove **13**.

In some embodiments, plate locking wedge **400** may further include at least one stopper **450** configured to resist movement of first slab **420** and/or second slab **430**, as further described hereinafter.

In some embodiments, at least one of first slab **420** and second slab **430** may include a first channel **460** and a second channel **462**. First channel **460** may at least partially accommodate stopper **450**, so as to limit movement of first slab **420** and/or second slab **430** due to stopper **450** resisting movement thereof. Thus, any movement of first slab **420** and/or second slab **430** may be refined such that accurate positioning of first slab **420** and/or second slab **430** may be

According to some embodiments, the securing of plate locking wedge **400** into it's position within external plate profile **10**, may be achieved with movement of first slab **420** thereby engaging tilting lock **440** so as to cause first retractable protrusion **441** to abut top groove **13** of external plate profile **10**. It should be appreciated that movement of first slab **420** and/or second slab **430**, towards the center of plate locking wedge **400**, may also tighten the positioning of plate **300** into place, due to the inclined surfaces of first slab **420** and/or second slab **430** that may push plate **300** while moving closer to center of plate locking wedge **400**. In some embodiments, movement of first slab **420** and/or second slab **430** may be achieved with a dedicated external tool.

In some embodiments, a reverse movement of first slab **420** and/or second slab **430** (away from the center of plate locking wedge **400**) may release the tightening of plate **300**. In some embodiments, first slab **420** and/or second slab **430** may be pulled by pulling edges **490** thereof. It should be appreciated that movement of tilting lock **440** (e.g., movement of first retractable protrusion **441**) to release top groove **13** may be accomplished only when first retractable protrusion **441** is completele moved away from the center of plate locking wedge **400**. In some embodiments, if plate locking wedge **400** no longer abuts top groove **13**, then it may be possible to retrieve plate locking wedge **400** from external plate profile **10**, for instance, using a dedicated tool.

Reference is now made to FIGS. **5**A-**5**B, which shows a flow chart for a method of aligning a plate **300** within an external plate profile **10**, according to some embodiments of the invention. The method may include providing **501** an external segment **110**, corresponding in shape to the external plate profile **10**, wherein the external segment **10** includes a socket **130** adapted to at least partially accommodate an external alignment tool **170** through a passage serving as a turning point for the external alignment tool **170**, and providing **502** an internal segment **120**, configured to accommodate a bottom portion of plate **300** and slide within external segment **110** along the transversal axis of external plate profile **10**.

In some embodiments, the method may further include positioning **503** internal segment **120** within the external segment **110**. In some embodiments, the method may further include positioning **504** external segment **110** within the external plate profile **10**. In some embodiments, the method may further include accommodating **505** a portion of plate **300** in internal segment **120**. In some embodiments, the method may further include moving **506** external segment **110** with external alignment tool **170**. In some embodiments, the method may further include moving **507** internal segment **120** within the external segment **110**. In some embodiments, the method may further include aligning **508** plate **300** to a desired position.

In some embodiments, the method may further include engaging external alignment tool **170** with socket **130**, wherein engagement of external segment **110** with external alignment tool **170** may be configured to indicate an angle of inclination of the plate **300**. In some embodiments, the

method may further include providing at least one additional external segment **110** and/or providing at least one additional internal segment **120**.

In some embodiments, internal segment **120** may include an alignment tool wedge-like portion **150** capable of accommodating a tip **180** of the alignment tool **170**, and wherein the method further includes engaging tip **180** of external alignment tool **170** with the wedge-like portion **150**.

In some embodiments, the method may further include moving internal segment **120** transversally to the longitudinal axis when sliding along the longitudinal axis of external segment **110**. In some embodiments, the method may further include rotatably turning internal segment **120** about the passage, thereby sliding the internal segment along the longitudinal axis. In some embodiments, the method may further include providing a resilient barrier **30**, configured to allow an inclination fixed point for the plate **300**.

Unless explicitly stated, the method embodiments described herein are not constrained to a particular order in time or chronological sequence. Additionally, some of the described method elements can be skipped, or they can be repeated, during a sequence of operations of a method.

Various embodiments have been presented. Each of these embodiments can of course include features from other embodiments presented, and embodiments not specifically described can include various features described herein.

The invention claimed is:

1. A plate stabilizing device configured to couple with an external U-shaped plate profile, wherein the external U-shaped plate profile comprises a base between two walls, the device comprising:

an external segment, corresponding in shape to the external U-shaped plate profile and configured to fit therein, wherein the external segment comprises a socket adapted to at least partially accommodate an external alignment tool through a passage serving as a turning point for the external alignment tool; and

an internal segment, configured to accommodate a bottom portion of the plate, the internal segment comprising an alignment tool wedge-shaped portion capable of accommodating a tip of the alignment tool,

wherein the internal segment is configured to move, within the external segment, transversally to the longitudinal axis of the external U-shaped plate profile, wherein the external segment is configured to slide along the longitudinal axis, and wherein the longitudinal axis is along the base of the external U-shaped plate profile; and

wherein the external segment is configured to be moved by the alignment tool when the alignment tool is inserted through the passage and rests at the wedge-shaped portion such that the alignment tool is rotatably turned about the passage thereby sliding the external segment along the longitudinal axis.

2. The device of claim **1**, wherein at least one of the external segment and the internal segment comprise an elastic material.

3. The device of claim **1**, configured to allow movement within the external U-shaped plate profile when the alignment tool moves the external segment to slide along the longitudinal axis.

4. The device of claim **1**, wherein engagement of the external segment with the external alignment tool is configured to indicate an angle of inclination of the plate with respect to a predetermined reference angle.

5. A plate stabilizing system configured to couple with an external U-shaped plate profile, wherein the external U-shaped plate profile comprises a base between two walls, the system comprising:

an external segment, corresponding in shape to the external U-shaped plate profile and configured to fit therein, wherein the external segment comprises a socket adapted to at least partially accommodate an external alignment tool through a passage serving as a turning point for the external alignment tool;

an internal segment, configured to accommodate a bottom portion of the plate, the internal segment comprising an alignment tool wedge-shaped portion capable of accommodating a tip of the alignment tool; and

a resilient barrier, configured to fix an inclination point for the plate,

wherein the internal segment is configured to move, within the external segment, transversally to the longitudinal axis of the external U-shaped plate profile, wherein the external segment is configured to slide along the longitudinal axis, and wherein the longitudinal axis is along the base of the external U-shaped plate profile; and

wherein the external segment is configured to be moved by the alignment tool when the alignment tool is inserted through the passage and rests at the wedge-shaped portion such that the alignment tool is rotatably turned about the passage thereby sliding the external segment along the longitudinal axis.

6. The system of claim **5**, wherein engagement of the external segment with the external alignment tool is configured to indicate an angle of inclination of the plate with respect to a predetermined reference angle.

7. The system of claim **5**, further comprising a plate locking wedge configured to be accommodated within said external U-shaped plate profile and engage the plate, the plate locking wedge comprising:

a first slab, having an inclined surface;

a second slab, having an inclined surface and configured to move in a direction opposite to the first slab; and

a tilting lock, having at least one retractable protrusion configured to engage the first slab with the external U-shaped plate profile upon movement of first slab,

wherein movement of the first slab and the second slab is configured to engage the inclined surfaces with the plate so as to secure the positioning of the plate.

8. A method of aligning a plate within an external plate profile, the method comprising:

providing an external segment, corresponding in shape to the external plate profile, wherein the external segment comprises a socket adapted to at least partially accommodate an external alignment tool through a passage serving as a turning point for the external alignment tool;

providing an internal segment, configured to accommodate a bottom portion of the plate,

positioning the internal segment within the external segment;

positioning the external segment within the external plate profile;

accommodating a portion of the plate in the internal segment;

moving the external segment with the external alignment tool;

moving the internal segment within the external segment; and

aligning the plate to a desired position.

9. The method of claim 8, further comprising engaging the external alignment tool with the socket, wherein engagement of the external segment with the external alignment tool is configured to indicate an angle of inclination of the plate.

10. The method of claim 8, wherein the internal segment comprises an alignment tool wedge-shaped portion capable of accommodating a tip of the alignment tool, and wherein the method further comprises engaging the tip of the external alignment tool with the wedge-shaped portion.

11. The method of claim 8, further comprising providing at least one additional external segment.

12. The method of claim 8, further comprising providing at least one additional internal segment.

13. The method of claim 8, further comprising rotatably turning the internal segment about the passage, thereby sliding the internal segment along the longitudinal axis.

14. The method of claim 8, further comprising providing a resilient barrier, configured to fix an inclination point for the plate, and inclining the plate to a desired inclination angle by engaging the plate with the resilient barrier at the inclination fixed point.

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